Exploration of the Utility of Pulse-Field Gel Electrophoresis Subtyping in Surveillance for *Salmonella* Serotype Enteritidis Infections in FoodNet Sites

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Background: Phage typing is the established method of sub typing *Salmonella* serotype Enteritidis (SE) for the purposes of epidemiologic investigations. However, phage typing is available only through a limited number of reference laboratories. Therefore, we explored the utility of pulsed-field gel electrophoresis (PFGE) as an epidemiological tool for SE infections. PFGE is a widely available technique which is being used as the basis for nationwide surveillance of *Escherichia coli* O157:H7 through PulseNet, the National Molecular Subtyping Network for Foodborne Disease Surveillance.

Methods: Isolates from patients enrolled in the 1996-1997 *Salmonella* case-control study conducted in the Emerging Infections Program's. Foodborne Diseases Active Surveillance Network (FoodNet) sites in California, Connecticut, Georgia, Minnesota and Oregon were subtyped by phage typing and PFGE. The most commonly identified PFGE subtype pattems were compared to evaluate differences between subtypes with regard to regional variability and potential risk factors.

Results: Eighteen PFGE subtypes of SE were identified among the 182 isolates tested; 45% were SE and 25% were SE11. Nineteen phage types were identified; 78% were phage types 4, 8, or ,13a, and 9% could not be assigned a known phage type. Eighty five percent of SE1 were phage types 13a or 8, and 75% of SE 11 were phage type 4. By multivariate analysis, SE11 cases were more likely than SE1 cases to have traveled internationally (odds ratio [OR]= 41; 95% confidence interval [CI] 8.9-186), or lived in California (OR= 26; 95% CI 5.3-129) or Oregon (OR= 57; 95% CI 8.2-399). In addition, two discrete clusters of cases were recognized; one in Connecticut (PFGE subtype SE27) and one in Minnesota (PFGE subtype SE20),

Conclusion: PFGE appears to have utility to provide epidemiological discrimination of SE infections. In general, PFGE results approximate those obtained by phage typing. For example, SE11 was a good marker for phage type 4 isolates acquired in endemic areas in foreign countries and on the West coast of the United States. In addition, PFGE may be useful in identifying clusters of SE cases which may represent previously unrecognized outbreaks. Although PFGE subtyping of SE isolates should not replace the existing applications of phage typing in the absence of timely phage-typing availability , PFGE would enhance surveillance for SE in support of SE control efforts such as the National Egg Safety Action Program. Capacity to perform PFGE is widely distributed among public health laboratories and results could be incorporated in the existing PulseNet surveillance system for foodborne pathogens. Ongoing comparisons of PFGE and phage typing will further define the optimal approach to public health surveillance of SE.

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